

Illicit Discharge Detection and Elimination Standard Operating Procedure

Prepared for
City of West Linn, Oregon
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Section 1

Introduction and Background

The City of West Linn's reissued municipal separate storm sewer (MS4) National Pollutant Discharge Elimination System (NPDES) permit (effective date: March 16, 2012) includes specific requirements and provisions related to implementation of their Illicit Discharge Detection, Enforcement, and Response (IDDE) program. Illicit discharges are, by definition in Schedule D.10.f of the City's MS4 NPDES permit: *"any discharge to a municipal separate storm sewer system that is not composed entirely of stormwater except discharges authorized under Section A.4.a.xii (of the permit), discharges permitted by an NPDES permit or other state or federal permit, or otherwise authorized by the Department."*

The City has been implementing their IDDE program since receipt of their initial Phase I MS4 NPDES permit in 1995. Program activities have historically included code and ordinance development and implementation (to prohibit and enforce against illicit discharges) and dry weather field screening activities to identify occurrences and sources of potential illicit discharges.

This Standard Operating Procedures (SOP) document is intended to summarize implementation of the IDDE program, focusing on the dry weather field screening monitoring activities required to be conducted as part of the program. This SOP includes the rationale and strategy for selection of high priority dry weather screening locations, dry weather field screening inspection activities, pollutant parameter action levels, and code and enforcement authority. Additionally, this SOP includes a field inspection form (Appendix A) to aid in the documentation and collection of information.

1.1 Permit Language and Requirements

As described in Schedule A.4.a of the City's MS4 NPDES permit, the IDDE program must:

- i) *Prohibit, through ordinance or other regulatory mechanism, illicit discharges into the co-permittee's MS4;*
- ii) *Include documentation in an enforcement response plan or similar document by November 1, 2012 describing enforcement response procedures the co-permittee will implement when an illicit discharge investigation identifies a responsible party.*
- iii) *Develop or identify pollutant parameter action levels used as part of the field screening.*
- iv) *Conduct annual dry weather inspection activities during the term of the permit...*
- v) *Identify response procedures to investigate portions of the MS4 that, based on the general observations, field screening, laboratory analysis or other relevant information...indicates the presence of an illicit discharge.*
- xi) *Maintain maps identifying known co-permittee-owned MS4 outfalls discharging to waters of the State. The dry-weather screening priority locations must be specifically identified on maps by November 1, 2012.*

The City has been conducting such activities but documentation of such procedures and information is not currently located in a singular location. This SOP provides the documentation for the above listed permit provisions.

1.2 Dry Weather Field Screening Monitoring Objectives

Dry weather field screening activities (and dry weather outfall monitoring) comprise a major element of the City's IDDE program. Dry weather field screening involves the inspection of select outfalls during dry weather conditions to determine if discharge is occurring. If discharge is occurring, the next steps are to identify the source of the discharge, determine whether the discharge is allowable, and eliminate the discharge if it is unallowable or anticipated to add pollutants to the MS4. Source identification and discharge characterization generally involves:

1. Visual observations and characterization.
2. Field analysis (on-site analysis for select field parameters).
3. Field tracking, or upstream system investigation to try and identify the pollutant source.
4. Laboratory analysis (sample collection for off-site analysis).

Implementation of dry weather field screening also addresses objectives of the City's monitoring program. Specifically, in addition to the dry weather field screening requirements listed in Schedule A.4.iv, the following monitoring objectives per Schedule B.1.a of the permit may be addressed:

- i) *Evaluate the source(s) of the 2004/2006 303(d) listed pollutants applicable to the co-permittee's permit area;*
- ii) *Evaluate the effectiveness of Best Management Practices (BMPs) in order to help determine BMP implementation priorities;*

Implementation of an effective dry weather field screening program may allow the City to identify periodic or ongoing sources of observable pollutant discharge. Additionally, it may inform how well the City's overall stormwater program implementation is being conducted, specifically elements such as public education and program enforcement.

1.3 Code and Enforcement Authority

The City of West Linn's Municipal Code (WLMC) prohibits against illicit discharges to the storm system per code section 4.063. Per WLMC section 4.063(1), *"it is unlawful to discharge or cause to be discharged directly or indirectly into the City storm sewer system and/or a surface water body, any of the following:*

- *Any discharge having a visible sheen;*
- *Any discharge having a pH of less than 6.0 Standard Units (S.U.) or greater than 9.0 (S.U.);*
- *Any discharge that contains toxic chemicals in toxic concentrations;*
- *Any discharge that contains visible floating solids;*
- *Any discharge which causes or may cause damage to the City's storm sewer system;*
- *Any discharge which causes interference in the City's storm sewer system;*
- *Any discharge which causes or may cause a nuisance or hazard to the City's system, City personnel, or the receiving waters."*

Enforcement provisions are outlined in the WLMC section 4.062(3) which states that *"no portions of (WLMC) section 4.000 to 4.090 or statement herein or subsequent interpretations or policies shall relieve any property owner of assessments levied against real property for a local improvement project or for abating conditions on the property that violate any provisions of this code."* Typical enforcement measures for illicit discharges to surface waters are not described in the code, but per WLMC section 4.075 (Enforcement), *"in addition to other lawful remedies, the City Manager may enforce the collection of charges required by Sections 4.005 to 4.090 by withholding delivery of water to any improved premises where the storm drain utility charges are delinquent or unpaid."*

Section 2

Priority Dry Weather Field Screening Locations and Selection

2.1 Monitoring Process/Study Design

In accordance with receipt of the City of West Linn's first MS4 NPDES permit in 1995, the City first identified field screening locations according to major outfalls (greater than or equal to 36 inches in diameter) and priority minor outfalls (greater than or equal to 12 inches in diameter that drain industrial zoned areas).

Since 1995, field screening locations have been slightly adjusted according to accessibility, ownership, and the past history of observed flow or discharges, but generally the same number of outfalls and locations have continued to be monitored.

For the City of West Linn, historical field screening locations were established to reflect discharge to many of the individual receiving waters within the City. Dry weather field screening activities resulted in no identification of illicit discharges over the last 5 year period. Historic complaints were limited to observations of small amounts of trash in the receiving water.

A majority of the City's historic field screening locations include significant levels of baseflow, which have prompted the City to review their existing sites in detail as part of this effort to identify high priority field screening sites. Digital review of the stormwater collection and conveyance system information indicated that some sites were actually piped perennial streams, and not solely stormwater outfalls. Field reconnaissance also confirmed that some existing field screening locations have significant baseflow from groundwater.

The City reviewed their historical dry weather field screening locations to identify those high priority locations with which to continue their dry weather field screening program for the 2012-2017 MS4 NPDES permit term. In establishing high priority locations, the City considered the following criteria:

1. Locations with observed flow/ historic complaints over the past 5 years.
2. Locations with upstream industry (or other high pollutant sources).
3. Locations with upstream development potential (such that there is the additional potential for new cross connections or pollutant sources).
4. Locations with upstream wastewater permits/ pretreatment activities.
5. Locations with aging infrastructure.
6. Site accessibility.

In addition to the above criteria, historical screening locations were evaluated according to the magnitude of baseflow associated with springs, groundwater, and stream flow. The significant presence of baseflow conditions present in multiple locations were determined to limit the ability of the City to definitively evaluate whether additional flow contributions from illicit discharges are occurring.

Each historical field screening location was evaluated in conjunction with the criteria (Table 1).

Table 1. West Linn High Priority Field Screening Locations

High priority screening site number ^a + Site Number	Historic screening site number ^b	Location description	Diameter, inches	Receiving water	Significant base flow contribution (Y/N)	Assessment criteria							Notes
						Observed flow ^c	Historical complaints ^c	Upstream commercial (high pollutant) sources	Upstream development potential	Upstream WW permits/pre-treatment	Aging infrastructure	Accessible?	
HP-1		Behind 2295 Brandon Place	18	Tualatin River	N				X			X	New site reflects same receiving water as historic site #3
HP-2	1	13th Street at I-205 (near 2150 13th Street)	48	Willamette River (Bernert Creek)	N	X		X				X	
HP-3		Between 4103 and 4081 Imperial Drive	18	Willamette River (Tanner Creek)	N							X	New site reflects same receiving water as historic site #14
HP-4	4	Trail near 1565 Hollowell	40	Willamette River (McLean Creek)	N			X			X	X	
HP-5	7	Century Drive at Lowry (2250 Tompkins)	12	Willamette River (Barlow Creek)	N	X						X	Location adjusted from historic to reflect 12-inch outfall from development instead of piped (30-inch) stream channel
HP-6		19625 Old River Drive	12	Willamette River (Robin Creek)	N			X				X	New site reflects same receiving water as historic site #10
7	2	10th Street at I-205	30	Willamette River (Bernert Creek)	Y	X						X	
8	3	Johnson Road at Ryan Court	60	Tualatin River	Y	X	X		X			X	Historic complaints show presence of floatables/garbage

Table 1. West Linn High Priority Field Screening Locations

High priority screening site number ^a + Site Number	Historic screening site number ^b	Location description	Diameter, inches	Receiving water	Significant base flow contribution (Y/N)	Assessment criteria							Notes
						Observed flow ^c	Historical complaints ^c	Upstream commercial (high pollutant) sources	Upstream development potential	Upstream WW permits/pre-treatment	Aging infrastructure	Accessible?	
9	5	Burns Street behind library (entry behind fire hydrant)	24	Willamette River (Maddax Creek)	Y	X	X					X	Historic complaints show presence of floatables/garbage
10	6	6105 Holmes Street	24	Willamette River (Bolton Creek)	Y	X						X	
11	8	3841 Mapleton Drive	96 (36-inch box culvert)	Willamette River (Trillium Creek)	Y	X			X			X	
12	9	Kenthorpe at Old River Drive	Ditch	Willamette River (Fern Creek)	Y	X			X			X	
13	10	Walling at Rose Way (18747 Rose Way)	36	Willamette River (Robin Creek)	Y	X						X	
14	11	Behind 2010 College Hill Place	21	Willamette River (Arbor Creek)	Y	X	X		X			X	Historic complaints show presence of floatables/garbage
15	12	Pimlico at Summit Drive	48	Willamette River (Mary S Young Creek)	Y	X						X	
16	13	Behind 5675 Summit Street	36	Willamette River (Mary S Young Creek)	Y	X						X	
17	14	Beside 3802 Wellington Court	42	Willamette River (Tanner Creek)	Y	X							Difficult to access

^a High priority screening sites per Figure 1.^b Historic outfall monitoring site numbers are provided for reference only.^c Observed flow and historical complaints refers to observed activities over the past 5 years.

2.2 High Priority Screening Locations

City staff conducted a field assessment on October 17, 2012, to confirm the condition and configuration of each outfall/historic field screening site and to identify new outfalls/ high priority screening locations that would have less of a baseflow contribution than previous sites. Based on the limited, observed illicit discharges over the past 5 years (permit period), the City felt that a thorough review of its existing sites would allow for selection of more targeted and representative sites.

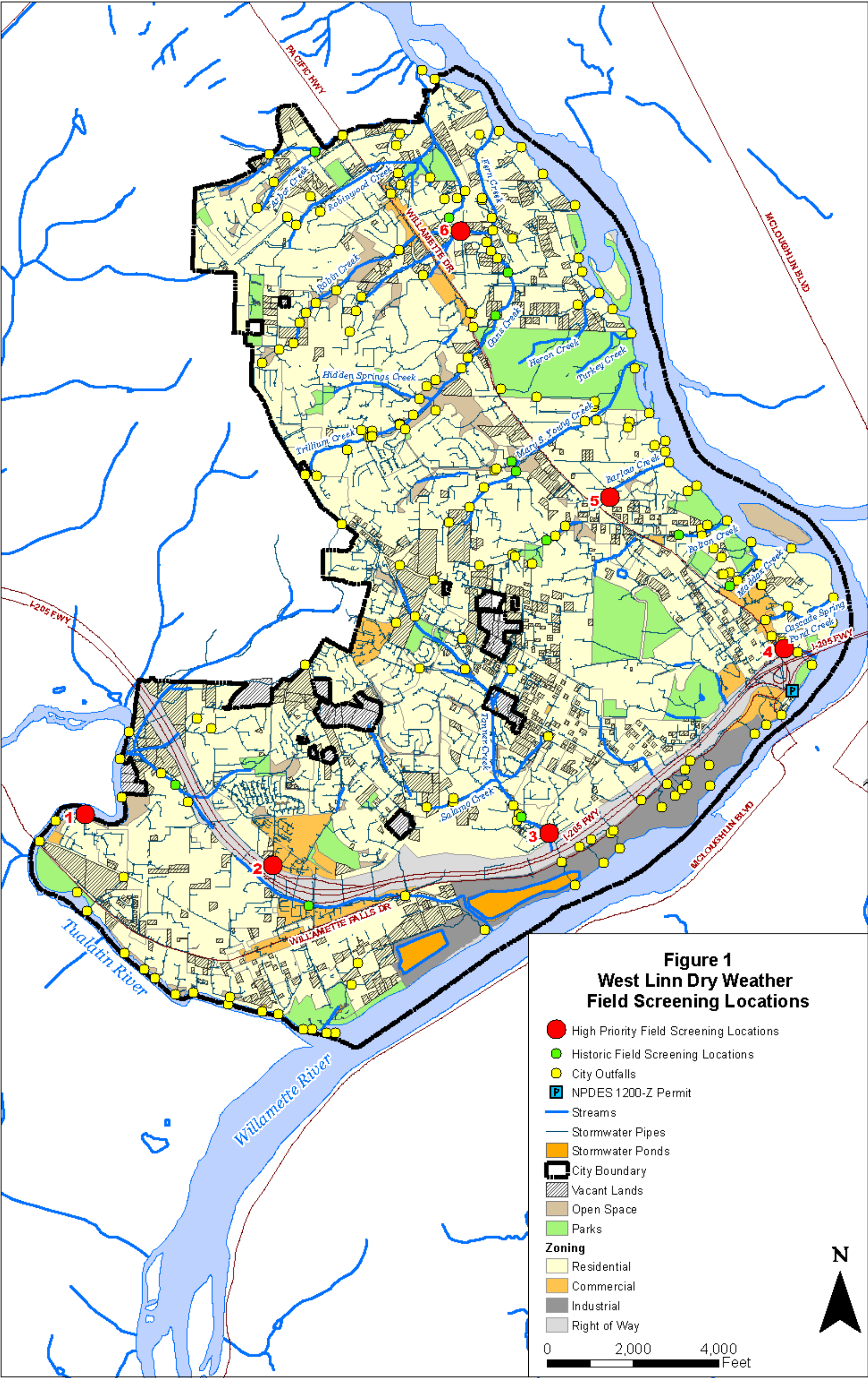
The assessment of historical field screening sites resulted in the identification of six high priority screening locations. Two of the sites (High Priority Site #2 and Site #4) reflect existing field screening sites that did not have significant baseflow contributions and met the criteria for the potential to have high pollutant sources upstream (i.e., commercial development) and had aging infrastructure.

During the field assessment, City staff also tried to determine if relocation of one of the existing sites would allow for observation of less baseflow and more non-stormwater flows (if they were occurring). One location (High Priority Site #5) was relocated from a historical location in order to eliminate observations of base flow. Site #5 was relocated to a 12-inch outfall from a residential development instead of the 30-inch combined open channel and piped surface water conveyance channel.

Three new high priority field screening locations (High Priority Sites #1, #3, and #6) were identified. New sites were identified to consistently reflect receiving waters that were reflected with previous field screening sites. Previous sites reflected mostly residential development, so an attempt was made to include sites that would also be reflective of commercial land use. Finally, one of the historic field screening sites had limited accessibility, which prompted review and identification of a new screening site for that receiving water (Tanner Creek).

The combination of existing and new field screening sites will allow the City to maintain wide aerial coverage for their dry weather field screening program and reflect potential discharges to multiple receiving waters.

Results of the assessment of historic and new field screening locations are provided in Table 1. The City's high priority screening locations are shown on Figure 1 (map). Photographs of each high priority location are provided in Appendix B.



Section 3

Standard Operating Procedure

3.1 Inspection Criteria

3.1.1 Weather

Dry weather screening will be conducted during dry summer months and following a 72-hour minimum antecedent dry period. Typical months for sampling are July, August or September.

3.1.2 Frequency/ Duration

Dry weather screening will be conducted once annually at high priority field screening locations as shown in Section 2.

Given the screening will be conducted at a frequency of once annually, preliminary identification of illicit discharges would most likely be reflective of flows of a continuous nature associated with cross connections. Intermittent spills or discharges from dumping activities that occur more randomly would be more difficult to catch with a field screening program.

3.1.3 Reported Complaints

The identification of intermittent spills or dumping would be more likely as a result of complaints received from the public or problems noted through routine City maintenance activities.

The City maintains a system for documenting reported complaints or noted problems and will investigate these potential illicit discharge activities using the same procedures provided in this document for problems identified through dry weather field screening.

3.2 Responsible Parties

The dry weather field screening activities will be conducted by a two-person crew directed by the City's Environmental Services Program Manager. The Environmental Services Program Manager will coordinate with the Engineering Division to assess proper weather conditions for field screening, and if applicable, ensuring the proper collection of samples for delivery to a lab for lab analysis. Any laboratory analysis of field samples will be conducted by a certified laboratory.

3.3 Safety Measures and Concerns

Field teams conducting dry weather screening and other field work should be properly trained and aware of potential safety hazards. Regular training for field personnel is essential for safe field practices. It is important for personnel to understand all potential hazards before entering any location. Screening of outfalls should always be conducted in groups of two at a minimum. Visual inspection of the outfall should be conducted before attempting any sample collection. If sample collection appears hazardous, a sample should not be collected and problems should be reported to the fire department. Proper lab gloves should be worn during the collection of samples. Basic safety equipment should also include appropriate protective clothing, field boots, visibility vests, cell phones, and first aid kits.

In some cases, follow-up tracking of flows may be conducted to identify the source of a flow. For tracking activities, safety equipment may also need to include flashlights, traffic cones, manhole cover lifters, air quality monitors, hardhats, safety glasses, or steel-toed boots. Field crews will need confined space entry

training if entering manholes is conducted. Confined space training will ensure that crews conduct appropriate air quality monitoring to ensure awareness of flammable gases if present. At least one crew member must stay outside of the manhole at all times for emergency rescue situations.

3.4 Pollutant Parameter Action Levels

Pollutant parameter action levels were developed and are required initially in order to screen observed discharges to determine whether further investigation and lab analysis is needed.

The pollutant parameter action levels include both visual analyses and field analyses as described below. These pollutant parameter action levels are also listed on the field data sheet provided in Appendix A.

Table 2. Pollutant Parameter Action Levels			
Pollutant parameter	Potential indicator of illicit discharge	Severity of observation	Action levels
Visual analyses			
Odor	An odor may be noticeable at the site which may be generally rancid or sour, or it may be more clearly identifiable as sewage or a petroleum related source.	#1-faint #2-easily detected #3-noticeable from a distance	<ul style="list-style-type: none">Two or more of these observations have a severity of #1 or greater, or,One or more of these observations have a severity of #3.
Color	A color may be present in the discharge. Different colors can indicate different sources. An example would be the lime green color associated with anti-freeze. Examples of other colors associated with specific sources of pollutants are provided in the photos attached to the field data sheet in Appendix A.	#1-faint colors in sample bottle #2-clearly visible in sample bottle #3-clearly visible in outfall flow	
Turbidity	Turbidity can indicate particulates such as sediment in the water and may range from looking slightly cloudy to completely opaque.	#1-slight cloudiness #2-cloudy #3-opaque	
Floatables (other than trash)	Some floatables such as toilet paper are indicators of illicit sanitary sewer connections. Other floatables could include petroleum sheens or soap suds.	#1-few/slight; origin not obvious #2-some; indications of origin (e.g., possible suds or oil sheen) #3-some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)	
Field analyses			
pH	pH can be a good indicator of liquid wastes from industries, which can have very high or low pH.	NA	Outside of range from 6.5 to 8.5
Conductivity	Conductivity can be strongly related with the total amount of dissolved material in water. Conductivity can have some value in detecting industrial discharges that have very high conductivity readings.	NA	Exceeds 500 µS/cm

3.4.1 Visual Analysis

During dry weather field screening, if flow is detected, flow will be evaluated per the visual pollutant parameters defined above. The field crew will report results of the visual inspection of the field data sheet (Appendix A). The visual inspection effort will also include reporting on the severity of each visual

parameter. The field data sheet includes three levels of severity for each visual parameter; #1 being the lowest severity, and #3 being the highest severity. These visual observations are recorded on the field data sheet.

Depending on severity, the visual parameters may trigger further investigation (see Section 3.6) and collection of a sample for laboratory analysis (see Section 3.5.2). Specifically, if any there is one or more visual observations with a severity level of #3 or if there are two or more visual observations with a severity of #1 or greater, then further investigation and sampling would be required.

3.4.2 Field Analysis

Field analyses for pH and conductivity will also be conducted if flow is observed. Regardless of the results of the visual analyses, further investigation (tracking of the source of flow) and collection of a sample for laboratory analysis will be conducted if either the pH or conductivity results trigger the parameter's action level. For pH, this would include flow with a pH outside of the range from 6.5 to 8.5. This pH range is based on Oregon in-stream water quality standards. For conductivity, this would include flows with a conductivity level that exceeds 500 $\mu\text{S}/\text{cm}$. This conductivity concentration is based on the City of Portland's IDDE program and its review of data which showed that local natural waters should have a conductivity concentration that is below this amount.

3.5 Dry Weather Field Screening Activities

3.5.1 Inspection

Each high priority outfall location will be investigated as part of the dry weather field screening efforts, and field data sheets will be completed for each outfall.

Inspections include both visual analysis and field analysis for pH and conductivity as described in Section 3.4, if flow is occurring at the outfall. Photographic examples are provided with the field data sheet to assist in the interpretation of visual observations and defining severity. At the conclusion of the inspection, a determination will be made as to whether pollutant parameter action levels were exceeded and whether further investigation and sampling is required.

3.5.2 Sampling

During dry weather field screening activities, there may be a need to conduct further investigation (source tracking) and take samples for laboratory analysis. Therefore, prior to dry weather field screening activities, all necessary sample bottles will be decontaminated and prepared for sampling. If flow is present and exceeds defined pollutant parameter action levels (Section 3.4), sample bottles will be properly labeled and a sample will be collected for laboratory analysis. Field personnel will wear gloves while collecting samples. Bottles will be stored in a cooler with ice and delivered to the certified lab for analysis.

Laboratory analysis may consist of bacteria, metals, nutrients, hydrocarbons, or other analyses deemed appropriate based on the observations and suspected sources from field screening. Analytical results may either be used to support further identification of the source of flow, or to provide any back up documentation that may be necessary for enforcement activities.

3.6 Source Identification Investigations

3.6.1 Tracking

If an illicit discharge is indicated based on exceedences of the pollutant parameter action levels, then the source of discharge will be investigated following sample collection activities. Source identification tracking starts at the outfall location and moves upstream. GIS mapping of the stormwater system and

information on contributing tax lots should be prepared in advance and used by field personnel to identify a potential source(s) upstream. Easy-to-access locations, such as manholes or catch basins, can be used to track flow. Typically, tracking at manholes/catchbasins should occur at an interval of approximately every quarter mile or until no more flow is observed. If no flow is observed, then tracking should work backwards toward the original location to narrow down the location of the source of the discharge.

If field investigations do not result in identification of the source of the illicit discharge, alternative investigative techniques will be considered depending on significance of the flow and lab sample results, such as dye testing, or closed circuit television.

According to the MS4 NPDES permit, *“once the source of an illicit discharge is determined, the co-permittee must take appropriate action to eliminate the illicit discharge, including an initial evaluation of the feasibility to eliminate the discharge, within 5 working days. If the co-permittee determines that the elimination of the illicit discharge will take more than 15 working days due to technical, logistical, or other reasonable issues, the co-permittee must develop and implement an action plan to eliminate the illicit discharge in an expeditious manner”*.

3.6.2 Enforcement

The City of West Linn may implement provisions of the WLMC in conducting enforcement activities related to illicit discharges. Generally, a verbal warning is given (if a responsible party is identified) to immediately stop discharging. Code enforcement and/or the Public Works Director will be called to notify and assist in stopping and removing the illicit discharge.

Depending on the nature of the discharge, clean up measures may be conducted by the responsible party or City. If the City conducts clean up efforts, an additional administrative fee may be assessed in addition to the cost of any clean up effort. Follow up inspections and monitoring of the site/ source will be conducted by the City.

Samples collected at the time of the observed illicit discharge will inform remediation/ clean up efforts and be used to establish any additional fees, fines, or penalties.

3.7 Data Management and Adaptive Management

Records of field screening activities and maps of outfalls will be maintained by the City. If changes to the outfall inventory are noted, maps will be corrected within 6 months of identifying the change. Dry weather field screening results will be reported to DEQ annually with the NPDES MS4 Annual Report. Results of field screening activities will also be reviewed as part of the permit renewal process. If, after five years, results consistently show no activity related to illicit discharges, the City will reconsider and potentially make changes to priority screening locations.

Appendix A: Dry Weather Field Screening Inspection Form

Dry Weather Field Screening Inspection Form

SECTION 1: General Information

Inspector(s):	Outfall ID/location:	Watershed area:
Date:	Time:	
Ambient temperature:	Rainfall in last 72 hours? (Y/N)	
Photo Nos:	GPS points:	
Upstream/Surrounding land use:		
<input type="checkbox"/> Industrial <input type="checkbox"/> Residential <input type="checkbox"/> Commercial <input type="checkbox"/> Parks/Open Space <input type="checkbox"/> Institutional <input type="checkbox"/> Other		

SECTION 2: Outfall Description

Type	Material	Shape	Number	Submerged	Dimensions (inches)
Closed pipe	<input type="checkbox"/> RCP <input type="checkbox"/> PVC	<input type="checkbox"/> Circular	<input type="checkbox"/> Single	<input type="checkbox"/> No	Diameter or dimensions (in x in): _____ _____ _____
	<input type="checkbox"/> CMP <input type="checkbox"/> HDPE	<input type="checkbox"/> Box	<input type="checkbox"/> Double	<input type="checkbox"/> Partially _____ %	
	<input type="checkbox"/> Other _____	<input type="checkbox"/> Elliptical	<input type="checkbox"/> Other _____	<input type="checkbox"/> Fully _____ %	
Open drainage	<input type="checkbox"/> Concrete <input type="checkbox"/> Rip-rap <input type="checkbox"/> Earthen	<input type="checkbox"/> Trapezoid			Depth: _____
	<input type="checkbox"/> Other _____	<input type="checkbox"/> Parabolic			Width: _____
	<input type="checkbox"/> Other _____	<input type="checkbox"/> Other _____			Bottom width: _____

Flow present? ☐ Yes ☐ No (If no flow is present, go to Section 5)

SECTION 3: Flow Indicators

Magnitude: ☐ Substantial ☐ Moderate ☐ Trickle

Odor		Color		Turbidity	Floatables (Not trash)	
<i>Description:</i>	<i>Severity:</i>	<i>Description:</i>	<i>Severity:</i>	<i>Severity:</i>	<i>Description:</i>	<i>Severity:</i>
<input type="checkbox"/> none	<input type="checkbox"/> 1- faint	<input type="checkbox"/> clear	<input type="checkbox"/> 1- faint colors in sample bottle	<input type="checkbox"/> 1- slight cloudiness	<input type="checkbox"/> sewage (toilet paper)	<input type="checkbox"/> 1- few/slight; origin not obvious
<input type="checkbox"/> sewage	<input type="checkbox"/> 2- easily detected	<input type="checkbox"/> brown	<input type="checkbox"/> 2- clearly visible in sample bottle	<input type="checkbox"/> 2- cloudy	<input type="checkbox"/> petroleum (oil sheen)	<input type="checkbox"/> 2- some; indications of origin (e.g. possible suds or oil sheen)
<input type="checkbox"/> sulfide	<input type="checkbox"/> 3- noticeable from a distance	<input type="checkbox"/> gray	<input type="checkbox"/> 3- clearly visible in outfall flow	<input type="checkbox"/> 3- opaque	<input type="checkbox"/> suds	<input type="checkbox"/> 3- some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)
<input type="checkbox"/> rancid/sour		<input type="checkbox"/> yellow			<input type="checkbox"/> other _____	
<input type="checkbox"/> petroleum/gas		<input type="checkbox"/> green				
<input type="checkbox"/> other _____		<input type="checkbox"/> red				
		<input type="checkbox"/> other _____				

Dry Weather Field Screening Inspection Form (continued)

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SECTION 4: Field Testing Results for Flowing Outfalls

pH	Conductivity
Outside of range 6.5-8.5? <input type="checkbox"/> Yes <input type="checkbox"/> No	Exceeds concentration? >500 $\mu\text{S}/\text{cm}$ <input type="checkbox"/> Yes <input type="checkbox"/> No

SECTION 5: Physical Indicators For Both Flowing and Non-Flowing Outfalls

Outfall damage	Deposits/stains	Abnormal vegetation	Poor pool quality	Pipe benthic growth
<input type="checkbox"/> no <input type="checkbox"/> cracking or chipping <input type="checkbox"/> peeling paint <input type="checkbox"/> corrosion <input type="checkbox"/> other _____	<input type="checkbox"/> no <input type="checkbox"/> oily <input type="checkbox"/> flow line <input type="checkbox"/> paint <input type="checkbox"/> other _____	<input type="checkbox"/> no <input type="checkbox"/> excessive <input type="checkbox"/> inhibited	<input type="checkbox"/> no <input type="checkbox"/> colors <input type="checkbox"/> suds <input type="checkbox"/> odors <input type="checkbox"/> oil sheen <input type="checkbox"/> trash/ debris <input type="checkbox"/> excessive algae <input type="checkbox"/> other _____	<input type="checkbox"/> no <input type="checkbox"/> brown <input type="checkbox"/> orange <input type="checkbox"/> green <input type="checkbox"/> other__
Comments:	Comments:	Comments:	Comments:	Comments:

SECTION 6: Probability of Illicit Discharge (proceed to Section 7 and 8 if discharge is identified as potential, suspect, or obvious)

☐ Unlikely
 ☐ Potential (presence of two or more indicators and/or pH or conductivity readings outside of range)
 ☐ Suspect (one or more indicators with a severity of #3)
 ☐ Obvious

SECTION 7: Data Collection

Sample taken for Lab? ☐ Yes ☐ No
 If yes, sample collected from: ☐ Flow in pipe/channel ☐ Pool/waterbody below outfall

SECTION 8: Tracking and Source Investigation Results

Describe any observations and results of the source tracking investigation effort and any additional issues/comments (e.g., repair or maintenance required, etc):

Visual Indicators of Illicit Discharges¹

Color and Turbidity



Slight Turbidity
Turbidity: 1
(Difficult to interpret this observation;
May be natural or an illicit discharge)



Color: Brown; Severity: 2
Turbidity Severity: 2



Highly Turbid Discharge
Color: Brown; Severity: 3
Turbidity Severity: 3



Sewage Discharge
Color: 3
Turbidity: 3



Paint
Color: White; Severity: 3
Turbidity: 3



Industrial Discharge
Color: Green; Severity: 3
Turbidity Severity: 3

¹ As adapted from the Center for Watershed Protection's Illicit Discharge Detection and Elimination Guidance Manual (October 2004).

Visual Indicators of Illicit Discharges (continued)**Suds or Foam**

Natural Foam
Note: Suds only associated with
high flows at the "drop off"
Do not record.



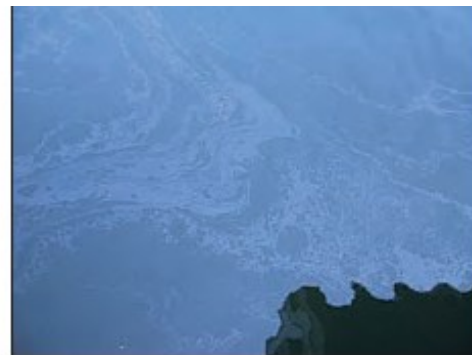
Low Severity Suds
Rating: 1
Note: Suds do not appear to travel;
very thin foam layer



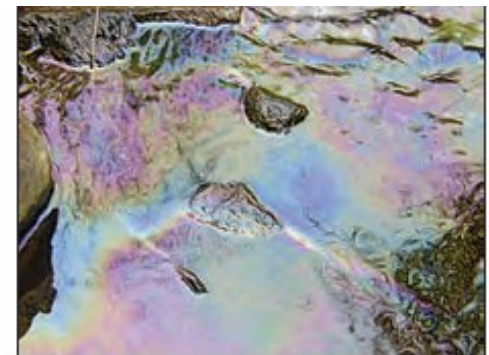
High severity suds
Rating: 3
Sewage

Oil Sheens

Low Severity Oil Sheen
Rating: 1



Moderate Severity Oil Sheen
Rating: 2



High Severity Oil Film
Rating: 3

Visual Indicators of Illicit Discharges (continued)**Algal and Bacterial Mats**

Algal mats on lakes indicate eutrophication. Several sources can cause this problem. Investigate potential illicit sources.



Illicit discharges or excessive nutrient application can lead to extreme algal growth on stream beds.



The drainage to this outfall most likely has a high nutrient concentration. The cause may be an illicit discharge, but may be excessive use of lawn chemicals.



Bacterial growth at this outfall indicates nutrient enrichment and a likely sewage source.



This bright red bacterial growth often indicates high manganese and iron concentrations. Surprisingly, it is not typically associated with illicit discharges.



Sporolitis filamentous bacteria, also known as "sewage fungus" can be used to track down sanitary sewer leaks.

Appendix B: High Priority Site Photographs
